WATERSHED MANAGEMENT AREA 7
RAHWAY AND ELIZABETH RIVER DRAINAGE

The watershed management area includes watersheds draining into the Arthur Kill and Newark Bay. Portions of this area are highly polluted. The area lies in parts of Middlesex, Union and Essex Counties and includes the following watersheds:

Rahway River
Elizabeth River

Summary of ambient physical/chemical monitoring stations and classifications

Station	Classification
Rahway River near Springfield	FW-2 Nontrout
Rahway River at Rahway	FW-2 Nontrout
Elizabeth River at Ursino Lake	FW-2 Nontrout

Note: Monitoring at the West Branch Rahway River at West Orange (FW-2 Nontrout) has been discontinued.

OVERALL MANAGEMENT AREA ASSESSMENT

- Swimmable Support Status:

WATERWAY	LOCATION	STATUS
Rahway River	near Springfield	No Support
Rahway River	at Rahway	No Support
Elizabeth River	at Ursino Lake	No Support

- Summary of Aquatic Life Support Status (Number of stations within each assessment category). Note: see the Biological Assessment Table located at the end of this section for details regarding macroinvertebrate assessments within the watershed management area.

No Impairment: 0 Mod. Impairment: 9 Severe Impairment: 3

MAPS here

RAHWAY AND ELIZABETH RIVER

WATERSHED DESCRIPTION

Measured from the headwaters to the City of Rahway, the Rahway River drains an area of 41 square miles, which includes parts of Middlesex, Union and Essex Counties. The mainstem, 24 miles long, flows from Union into the Arthur Kill near Linden and is tidal from the Pennsylvania Railroad bridge at Rahway down to the mouth. This is a densely populated area, with the centers of population being Rahway, Woodbridge, Clark, Springfield, Cranford, Westfield and Kenilworth. Major tributaries to the Rahway River include the East Branch Rahway River, Woodbridge River and Robinsons Branch. The major impoundments are the Middlesex Reservoir, Orange Reservoir, Lower and Upper Echo Lakes and Diamond Mill Pond. The Elizabeth River is 11 miles long, much of it channelized for flood control purposes.

Land uses in these watersheds are principally residential, commercial and industrial. There are over 50 NJPDES permitted discharges identified in the Rahway and Elizabeth watersheds; all except approximately five are industrial/commercial. The waters of the Rahway and Elizabeth Rivers and tributaries have been classified FW-2 Nontrout, SE-2 and SE-3.

WATER QUALITY ASSESSMENT

Physical/Chemical Water Quality

Locations: Rahway River near Springfield and at Rahway

Dissolved Oxygen: One violation out of 19 recordings of the DO criterion was observed at the station near Springfield. Summer and fall DO recordings tended to be low (around 5 mg/l) as compared to those recorded downstream at Rahway. At Rahway DO was acceptable for nontrout waters.

Temperature: No violations of the upper criterion for non-trout waters at either location.

Nutrients: Phosphorus was elevated at both locations. Near Springfield, phosphorus levels exceeded the criterion in 33% of samples, and the median value was 0.065 mg/l. At Rahway, 35% of samples exceeded the criterion and the median value was 0.075 mg/l. Inorganic nitrogen (nitrate + nitrite) was elevated at both locations, with median values of 1.26 mg/l and 0.885 mg/l, respectively.

Bacteria: Highly elevated at Rahway with a fecal coliform geometric mean of 1201 MPN/100ml; also highly elevated near Springfield where the geometric mean was 852 MPN/100ml.

Rahway River continued:

Sodium: Elevated at both locations. Near Springfield, 25% of records exceeded the criterion and the median value was 37 mg/l. At Rahway, 15% of samples exceeded the criterion and there the median was 30 mg/l.

Heavy Metals:. A lead sample (one out of four) exceeded the chronic criterion for aquatic life support at the monitoring location near Springfield. A recording of 5 ug/l of arsenic was also observed at this location and represents a concern if water in this location or downstream is used for human consumption. Also at this location was an elevated copper sample (again one out of four) that approached but did not exceed the aquatic life support chronic criterion.

At Rahway, one sample of a total of five contained a high lead level (25 ug/l total rec.) that significantly exceeded the chronic criterion. On the same day, a very high copper record was observed (18 ug/l total rec.) which exceeded both acute and chronic criteria for this metal.

Other: The Rahway station showed one exceedance of the upper pH criterion (out of 19 samples).

Summary: Both monitoring locations (near Springfield and at Rahway) on the Rahway exhibited elevated phosphorus, bacteria, sodium and lead. In addition, Springfield DO recordings tended to be low in summer and fall compared to Rahway. Here also, elevated copper as well as lead may be a problem.

The Rahway near Springfield has shown some improvement over conditions observed during the last period of review (1986 through 1990) with regard to sanitary quality. The current fecal coliform geometric mean is about half of that previously observed. Conditions at Rahway more or less mirror the previous assessment.

The monitoring location on the West Branch Rahway River was discontinued in 1991. Previously, during the last period of assessment, this location showed excess levels of fecal coliform bacteria, total phosphorus and total dissolved solids. Fecal coliform counts had a geometric mean of 1,126 MPN/100ml from 1986 through 1990. Total phosphorus has averaged 0.07 mg/l, during which 63 percent of samples exceeded the State criterion. Total dissolved solids have averaged 511 mg/l - among the highest of all freshwater monitoring stations in the state. Dissolved oxygen concentrations have appeared adequate at this location.

Locations: Elizabeth River at Ursino Lake

Dissolved Oxygen: Acceptable for nontrout waters.

Temperature: No violations of the upper criterion for non-trout waters

Nutrients: Phosphorus was elevated; levels exceeded the criterion in 35% of samples, and the median value was 0.07 mg/l. Inorganic nitrogen (nitrate + nitrite) was relatively high, with a median value of 1.66 mg/l.

Bacteria: Highly elevated, with a geometric mean of 1167 MPN.

Sodium: Elevated with 50% of records exceeding the criterion and a median value of 51.5 mg/l.

Heavy Metals:. A recording of 2 ug/l of arsenic was also observed at this location during the early part of the review period.

Other: The Elizabeth River showed two exceedances of the upper pH criterion (out of 20 samples). This could suggest eutrophic conditions with very active photosynthesis.

Summary: The Elizabeth River drains highly developed urban lands adjacent to the Rahway watershed. The river, as monitored at Ursino Lake, contains excessive nutrients (phosphorus), bacteria and sodium. Water quality in the Elizabeth River may have undergone a slight improvement as compared to the last period of review (1986 through 1990). During the earlier assessment, 66 percent of the samples exceeded the phosphorus criterion. The current analysis found 35 percent in exceedance.

Biological Monitoring

The Rahway mainstem is assessed as moderately impaired throughout its entire length. The South Branch of the Rahway is moderately impaired at its upper portion and severely impaired in the lower half. The upper portion of Robinsons Branch in Scotch Plains is assessed to be severely impaired while the lower portion in Rahway is moderately impaired. The Elizabeth River is determined to be moderately impaired in the upper portion in Union; the lower portion in Elizabeth is severely impaired. See the Biological Assessment Table located at the end of this section for details regarding macroinvertebrate assessments within the watershed.

POINT SOURCE ASSESSMENT

Water quality of the Rahway and Elizabeth Rivers are reflective of urbanized streams. The presence of high levels of nutrients, dissolved solids and fecal coliform bacteria are thought to be from both nonpoint sources and municipal/industrial point sources. Both the Lower Elizabeth and Rahway Rivers have combined sewer overflows discharging during storm events; however, the impacts are believed to be most severe in the Elizabeth River. Only one Department enforcement action against an unpermitted discharge in these watersheds is reported, see table below. Hazardous waste sites are

present in these watersheds, however, their status in contaminating surface waters is unclear (see Nonpoint Source Assessment below).

Current status of an unpermitted waste water discharge within the Rahway Watershed that is reported to be in noncompliance with its discharge permit:

FACILITY	LOCATION	RECEIVING WATER	POLLUTANT	COMMENTS
Polychrome Corp.	Clark	Robinsons Branch of Rahway River	alcohols (COD>5000 mg/l)	Facility possesses an unpermitted discharge of highly contaminated sump water. Temporary holding tanks have been installed to contain the discharge for proper disposal. A Notice of Violation has been issued and negotiations are now in progress to settle the matter. Discharge ceased within 24 hours of DEP issuing the Notice, which resulted in significant improvements in the water quality in Robinsons Br.

NONPOINT SOURCE ASSESSMENT

The Rahway River watershed is highly urbanized and its waterways are severely degraded by nonpoint source pollution and by the physical alterations of the stream channel which extensive urbanization has brought about. In addition to pollution and habitat destruction, flood control has been a major problem in this watershed. Known sources of nonpoint pollution in the Rahway River include construction activities, storm sewers, urban surfaces, roads, and combined sewer overflows; all of these have contributed to high stream temperatures, sediment and nutrient loadings, periodic low dissolved oxygen levels and fishkills. Another problem in this watershed may be landfill leachate which in the past was believed to have contributed to the degradation of the tidal Rahway River, as well as to the adjacent Arthur Kill, Marshes Creek and Kings Creek.

Morses Creek and the Elizabeth River, draining almost totally developed watersheds, have been extensively channelized. Both in the past were judged to support minimal fish life due to the combined effects of habitat loss and severe water pollution levels coming from numerous nonpoint and point sources. The Elizabeth River has been described as chronically polluted over its entire length.

DESIGNATED USE ASSESSMENT

The Rahway and Elizabeth Rivers do not support primary contact recreation based upon sanitary conditions at their respective monitoring sites. The aquatic life support designated use is moderately supported in the Rahway River, as well as in portions of the South Branch of the Rahway, Robinsons Branch and the Elizabeth River. The use is not supported in the upper portion of Robinsons Branch and the lower reach of the Elizabeth River.

BIOLOGICAL ASSESSMENT TABLE: AREA 7

Mgt Area	Watershd	Site ID	Water Body	Location	Municipality	Sample Date	Biological Impairment Rating
7	27	AN0192	Rahway R	Northfield Ave	W Orange	Feb 20, 1992	moderately impaired
7	27	AN0193	Rahway R	Washington Ave (Rt 82)	Springfield	Feb 20, 1992	moderately impaired
7	27	AN0194	Rahway R	Kenilworth Blvd	Springfield	Feb 20, 1992	moderately impaired
7	27	AN0195	Rahway R	River Rd & Church St	Rahway	Feb 19, 1992	moderately impaired
7	27	AN0196	Robinsons Br	Goodmans Crossing	Scotch Plains	Feb 19, 1992	severely impaired
7	27	AN0197	Robinsons Br trib	Raritan (Terrell) Rd	Scotch Plains	Feb 19, 1992	moderately impaired
7	27	AN0198	Robinsons Br trib	Lamberts Mill Rd	Westfield Twp	Feb 19, 1992	moderately impaired
7	27	AN0199	Robinsons Br	Rt 27	Rahway	Feb 19, 1992	moderately impaired
7	27	AN0200	Rahway R S Br	Parsonnage Rd	Menlo Pk	Feb 19, 1992	moderately impaired
7	27	AN0201	Rahway R S Br	Maplewood Ave	Colonia	Feb 19, 1992	severely impaired
7	28	AN0202	Elizabeth R	Lakeview Rd & Maple Terr	Union	Jul 6, 1993	moderately impaired
7	28	AN0204	Elizabeth R	Summer St	Elizabeth	Jul 6, 1993	severely impaired